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I CLAIM:

1. A method of producing heat energy, comprising the steps of:
providing a container for receiving an electrolyte composition, a cathode and an anode;
forming an electrolyte composition comprising D₂O and an ionizable acid;
5 placing a sufficient amount of the electrolyte composition in the container to at least
partially cover a cathode made from a metal selected from the group consisting of nonhydride
forming metals and to at least partially cover an inert anode situated inside the container;
connecting the cathode and anode to a source of electricity; and
applying a voltage across the cathode and anode.
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2. The method according to claim 1 wherein the cathode is made from a metal selected
from the group consisting of palladium, platinum and titanium.
3. The method of claim 1 wherein the electrolyte during the application of voltage is
15 held within a container and wherein said container bounds a space above the electrolyte, said
space providing a region for the recombining of gases produced during the electrolysis.
4. The method of claim 1 wherein a catalyst is provided within said region catalyzing
the recombining of gases produced by the electrolysis.
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5. The method according to claim 1 wherein the cathode is made from palladium.
6. The method according to claim 5 wherein the size of the cathode is about 1 cm².
- 25 7. The method according to claim 1 wherein the cathode is made from titanium.
8. The method according to claim 1 wherein the inert anode is a platinum anode.
9. The method according to claim 1 wherein the electrolyte composition consists
30 essentially of D₂O and about 15% sulfuric acid by volume.

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10. The method according to claim 9 wherein the cathode is made from palladium or titanium.

5 11. A method of producing heat energy, comprising the steps of:
 providing a container for receiving an electrolyte composition, a cathode and an anode;
 forming an electrolyte composition comprising D₂O and sulfuric acid;
 placing a sufficient amount of the electrolyte composition in a container to at least
partially cover a cathode made from a metal selected from the group consisting of nonhydride
forming metals and to at least partially cover an inert anode situated inside the container;
10 connecting said cathode and anode to a source of electricity; and
 applying a voltage of about 3.5 volts across the cathode and anode.

 12. A method of producing heat energy, comprising the steps of:
 providing a container for receiving an electrolyte composition, a cathode and an anode;
15 forming an electrolyte composition consisting essentially of D₂O and 15% by volume
sulfuric acid;
 placing a sufficient amount of the electrolyte composition in a container to at least
partially cover a palladium or titanium cathode and an inert anode situated inside the container,
wherein the container bounds a space above said electrolyte composition;
20 connecting said cathode and anode to a source of electricity;
 applying a voltage across the cathode and anode; and
 providing a catalyst within the space above the electrolyte composition to catalyze the
recombination of gases produced by the electrolyte.